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(54) **CONTROL DEVICE.**

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US-A- 4 265 047
US-A- 4 512 567
US-A- 4 659 313

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Description

This invention relates to a control device for computers or other data processing apparatus and is applicable particularly, but not exclusively, to a control device for providing control signals to a computer simulating a vehicle being driven.

Control devices which simulate vehicles being driven are, of course, well known. For example US 4512567 against which claim 1 is delimited relates to an exercise bicycle adapted for controlling video games. The bicycle comprises a handlebar movable in a first rotational manner, and a second pivotal manner, about a support shaft of the bicycle frame. The handlebar comprises a shaft provided with fixed hand grips, so that the handlebar resembles that of a conventional bicycle.

US 4265047 is concerned with a toy vehicle apparatus for simulating sound effects associated with realistic driving situations. The apparatus comprises a steering wheel, accelerator pedal, brake pedal, gear selector and ignition switch. The steering wheel is rotatably mounted about a fixed axis of rotation. A sensing device is provided for sensing the rotation of the steering wheel beyond a predetermined rotation in either direction.

The above described documents disclose apparatus capable of simulating the steering of a particular type of vehicle. It has however been found to be desirable to provide control apparatus capable of simulating the steering of more than one type of vehicle. We have now developed a control device which helps to achieve the above aim.

The present invention is therefore concerned with a control device for data processing apparatus, the device including a handlebar comprising a first handlebar shaft extending outwardly from one side of a column and a second handlebar shaft extending outwardly from a second side of the column, the handlebar being rotatably mounted to the column for rotation about a first axis such that manual rotation of the handlebar about the first axis produces a first electrical control signal for transmission to said data processing apparatus, the column being manually rotatably about a second axis which is inclined to the first axis and displaced therefrom, and arranged such that rotation of the column about the second axis produces a second electrical control signal for transmission to the data processing apparatus.

The improvement provided by the present invention is that each of the handlebar shafts has, at the respective end thereof, a hand grip portion obliquely pivoted to the respective handlebar shaft in such a way that in a first disposition the hand grip is substantially aligned with the respective handlebar shaft and in a second disposition the hand grip extends away from the second axis in a direction substantially tangential to, or substantially circumferential with, an orbital trajectory around the first axis.

Each hand grip is obliquely pivoted to the respective handlebar shaft typically in such a way that in the first disposition the hand grip is substantially aligned with the shaft so as to simulate handlebars of a motor cycle, and in the second disposition the hand grip extends away from the second axis in a direction substantially tangential to, or substantially circumferential with, an orbital trajectory around the first axis, so as to simulate a joystick of an aircraft, wherein the shafts represent spokes and the outer handgrips are generally parallel to one another.

Preferably, the control device includes a hand wheel to simulate a steering wheel of a car or the like, the hand wheel being adapted to attach onto the hand grips when the latter are in the second circumferential disposition (that is, simulating an aircraft joystick).

Preferably the first and second control signals are produced by first and second potentiometers controlled by movement of the handlebar and the column about the first and second axis respectively. The potentiometers may be rotary types each mounted coaxially with the respective first and second axis.

Conveniently the control device is adapted to be operated by an operator, with the first axis aligned in a direction generally towards and away from the operator and with the second axis below the first axis and transverse to the operator and in front of him.

Preferably the first and second handlebar shafts (which may be integral such that one is a continuation of he other) lie in or close to a plane displaced from and below the first axis, the hand grips being provided on the ends of the respective shafts, the longitudinal axis of the hand grips intersecting on or near the first axis. The hand grips may be slightly curved.

Preferably, the control device includes a base to which the lower end of the column is rotatably mounted for rotation about the second axis, the handlebar being mounted on the upper end of the column for rotation about the first axis.

The column may be lockable to the base, so that the first axis can be set near vertical to simulate the steering head angle of a motorcycle, or near horizontal to simulate the steering column angle of a car or the like, and the column may be allowed limited angular rotational movement about the second axis to simulate fore-and-aft movement of an aircraft joystick.

The control device according to the invention may also include a further manually operable lever, movable to produce another electrical signal to the data processing apparatus, to simulate a throttle or power control of an aircraft. The control device may further include foot-operable control means operable to produce a further electrical signal to the data processing apparatus.

Various embodiments of the invention will now be described, by way of example only, with reference to

the accompanying drawings, in which:-

Figure 1 is a perspective view of a control device according to the invention;

Figure 2 is similar to Figure 1, with various parts omitted or broken away to reveal the interior construction thereof;

Figure 3 is a view in the direction of the arrow III in Figure 1;

Figure 4 is a side view of the control device shown in Figure 1, simulating an aircraft joystick control;

Figure 5 is a rear perspective view of the control device shown in Figure 1, simulating a motor vehicle steering control; and

Figure 6 is a side view of the control device shown in Figure 5, in a stowing position.

In the drawings, a hollow plastics column 10 is rotatably mounted at the bottom thereof about a transverse axis 11 (shown in Figure 2) on spigots 12 to the side arm of a generally U-shaped base 13. A hub member 14 is rotatably mounted to the upper end of the column 10 about an axis 15 (shown in Figure 2) normal to the axis 11 and normal to the long axis of the column 10.

A handlebar 16 protrudes laterally and symmetrically from either side of the hub member 14, to which the handlebar is rotatably mounted. Each side of the handlebar comprises inner portions 17 and hand grips 18. Thus, the inner portions 17 and hand grips 18 can be generally aligned, to simulate the handlebars of a motor cycle, as shown in Figures 1 and 3. The hand grips 18 can be rotated until they reach, and stay at, positions in which they extend away from axis 11 in a direction substantially tangential to, or substantially circumferential with, an orbital trajectory around axis 15 as shown in Figures 3,4 and 5. The handlebar 16 then simulates a joystick of an aircraft, and for greater realism the hand grips 18 may be arcuate about the axis 15.

In order to simulate the steering wheel 19 of a motor car, truck, boat or the like, as shown in Figure 5, a loose wheel rim 20 of U-shaped cross-section may be clipped onto the hand grips 18, when in the aircraft joystick disposition, being enabled by the arcuate shape of the hand grips 18.

Rotation of the hub member 14 about the axis 15 produces electrical signals, to be fed to a data processing apparatus, by means of a transducer 21, which may be a potentiometer of the resistive, inductive or capacitive type. Similarly, rotation of the column 10 on the base 13, about the axis 11, produces electrical signals, to be fed to the data processing apparatus, by means of a similar transducer 22.

A locking or clamping lever 23 enables the column 10 to be fixed at a high position, when simulating a steering wheel, as in Figure 5, or at a lower position, with the axis 15 nearer the vertical, when simulating a motorcycle. When used to simulate an aircraft joystick, the column is allowed limited fore-and-aft travel near the upright position, between the dotted and solid line positions shown in Figure 4.

A simulated throttle or other power-controlling lever 24 is provided at one side of the base 13. The lever 24 operates a transducer 25 to produce electrical signals to be fed to the data processing apparatus.

Two other control signals may be provided for the data processing apparatus by foot-operated pads or pedals 26 in a housing 27 which may be placed on the floor. The pads 26 operate suitable transducers within the housing 27.

The base 13 is formed with strengthening ribs 28 which can enter a hollow 29 in the back of the column 10, when the column 10 is folded down to the base 13 for stowing away.

In some embodiments of the invention, the handlebar may be provided with biassing means for biassing the handlebar to a central position.

The electrical signals fed to the data processing apparatus may be processed thereby to control a display on a video display unit (VDU) screen. The system may be used for various games, tests of skill or for training purposes.

In some embodiments of the invention, the data processing apparatus may comprise a microprocessor and associated circuitry provided within the control device itself.

Claims

1. A control device for data processing apparatus, said device including a handlebar (16) comprising a first handlebar shaft (17) extending outwardly from one side of a column (10) and a second handlebar shaft (17) extending outwardly from a second side of said column (10), said handlebar (16) being rotatably mounted to said column (10) for rotation about a first axis (15) such that manual rotation of said handlebar (16) about said axis (15) produces a first electrical control signal for transmission to said data processing apparatus, said column (10) being manually rotatable about a second axis (11) which is inclined to said first axis (15), and arranged such that rotation of said column (10) about said second axis (11) produces a second electrical control signal for transmission to the data processing apparatus, each of said handlebar shafts (17) having, at the respective end thereof, a hand grip portion (18), characterised in that the second axis (11) is displaced from the first axis (15) and further in that each handle grip portion (18) is obliquely pivoted to the respective handlebar shaft (17) in such a way that in a first disposition said hand grip (18) is substantially aligned with the respective handlebar shaft (17), and in a second disposition said hand grip (18) extends away from said second

axis (11) in a direction substantially tangential to, or substantially circumferential with, an orbital trajectory around said first axis (15).

2. A control device according to claim 1, which further comprises a hand operable wheel (19) adapted for attachment to said hand grips (18) when the latter are in the respective second dispositions.

3. A control device according to claim 1 or 2, wherein said first and second control signals are produced by first and second potentiometers (21) controlled by respective movement of said handlebar (16) and said column (10) about said first axis (15) and second axis (11).

4. A control device according to claim 3, in which said potentiometers (21) are of rotary type and are mounted coaxially with the respective first axis (15) and second axis (11).

5. A control device according to any of claims 1 to 4, which includes a base (13) to which the lower end of said column (10) is rotatably mounted, the handlebar (16) being rotatably mounted on the upper end of said column (10).

6. A control device according to claim 5, which is further provided with means (12) for locking said column (10) to said base (13) such that the first axis (15) can be set approximately vertically and/or approximately horizontally.

7. A control device according to claim 6, wherein said column (10) is capable of fore-and-aft movement about said second axis (11) when said locking means (12) is disengaged.

8. A control device according to any of claims 1 to 7, which is arranged to be operated by an operator, with the first axis (15) aligned in a direction generally towards and away from the operator and with the second axis (11) below the first axis (15) and transverse to the operator and infront of him.

9. A control device according to any of claims 1 to 8, which further comprises a manually operable lever (24) and/or foot-operable control means (26), said lever (24) and said control means (26) being each operable to produce a respective further electrical signal to the data processing apparatus.

10. A control device according to any of claims 1 to 9, wherein said data processing apparatus comprises a microprocessor and associated circuitry provided within the control device itself.

Patentansprüche

1. Steuervorrichtung für Datenverarbeitungsgeräte, mit einer Lenkstange (16), die eine erste Lenkstangenachse (17), die sich von einer Seite einer Säule (10) nach außen erstreckt, und eine zweite Lenkstangenachse (17), die sich von einer zweiten Seite der Säule (10) nach außen erstreckt, umfaßt, wobei die Lenkstange (16) drehbar an der Säule (10) zur Drehung um eine erste Achse (15) gelagert ist, so daß eine manuelle Drehung der Lenkstange (16) um die erste Achse (15) ein erstes elektrisches Steuersignal zur Übertragung zu dem Datenverarbeitungsgerät erzeugt, wobei die Säule (10) manuell um eine zweite Achse (11) drehbar ist, die zur ersten Achse (15) geneigt und so angeordnet ist, daß die Drehung der Säule (10) um die zweite Achse (11) ein zweites elektrisches Steuersignal zur Übertragung zu dem Datenverarbeitungsgerät erzeugt, wobei die Lenkstangenachsen (17) an ihrem entsprechenden Ende ein Handgriffteil (18) aufweisen, dadurch gekennzeichnet, daß die zweite Achse (11) gegenüber der ersten Achse (15) versetzt ist, und daß jeder Handgriffteil (18) geneigt zu der entsprechenden Lenkstangenachse (17) so gelagert ist, daß in einer ersten Lage der Handgriff (18) im wesentlichen mit der entsprechenden Lenkstangenachse (17) ausgerichtet ist, und daß der Handgriff (18) sich in einer zweiten Lage von der zweiten Achse (11) weg in eine Richtung erstreckt, die im wesentlichen tangential zu oder im wesentlichen in Umfangsrichtung einer orbitalen Trajektorie um die erste Achse (15) verläuft.

2. Steuervorrichtung nach Anspruch 1, die ferner ein von Hand betätigbares Rad (19) umfaßt, das für Anbringung an den Handgriffen (18) angepaßt ist, wenn die letzteren sich jeweils in der zweiten Lage befinden.

3. Steuervorrichtung nach Anspruch 1 oder 2, bei der die ersten und zweiten Steuersignale durch erste und zweite Potentiometer (21) erzeugt werden, die durch entsprechende Bewegung der Lenkstange (16) und der Säule (10) um die erste Achse (15) und die zweite Achse (11) gesteuert werden.

4. Steuervorrichtung nach Anspruch 3, bei der die Potentiometer (21) von einer drehbaren Ausführung sind und koaxial zur ersten Achse (15) bzw. zur zweiten Achse (11) gelagert sind.

5. Steuervorrichtung nach einem der Ansprüche 1

bis 4, die eine Basis (13) enthält, an der das untere Ende der Säule (10) drehbar gelagert ist, wobei die Lenkstange (16) drehbar am oberen Ende der Säule gelagert ist.

6. Steuervorrichtung nach Anspruch 5, die ferner Mittel (12) zum Arretieren der Säule (10) an der Basis (13) enthält, so daß die erste Achse (15) annähernd vertikal und/oder annähernd horizontal festlegbar ist.

7. Steuervorrichtung nach Anspruch 6, bei der die Säule (10) eine Vor- und Rückbewegung um die zweite Achse (11) ausführen kann, wenn die Arretierungsmittel (12) außer Eingriff sind.

8. Steuervorrichtung nach einem der Ansprüche 1 bis 7, die so ausgebildet ist, daß bei einer Betätigung durch eine Bedienungsperson die erste Achse (15) in eine Richtung weist, die allgemein zu der Bedienungsperson hin und von dieser zurück verläuft, und die zweite Achse (11) unterhalb der ersten Achse (15) und quer zu der Bedienungsperson sowie vor dieser verläuft.

9. Steuervorrichtung nach einem der Ansprüche 1 bis 8, die ferner einen manuell betätigbaren Hebel (24) und/oder fußbetätigbare Steuermittel (26) aufweist, wobei der Hebel (24) und die Steuermittel (26) jeweils betätigbar sind, um ein entsprechendes weiteres elektrisches Signal für das Datenverarbeitungsgerät zu erzeugen.

10. Steuervorrichtung nach einem der Ansprüche 1 bis 9, bei der das Datenverarbeitungsgerät einen Mikroprozessor und zugehörige Schaltungen umfaßt, die in der Steuervorrichtung selbst vorgesehen sind.

Revendications

1. Dispositif de commande d'appareil de traitement de données comprenant un manche (16) comprenant une première branche (17) partant d'un côté d'une colonne (10) et une seconde branche partant de l'autre côté de ladite colonne (10), ledit manche (16) étant monté rotatif sur ladite colonne (10) de manière à pouvoir tourner autour d'un premier axe (15) de façon qu'une rotation manuelle dudit manche (16) autour dudit axe (15) produise un premier signal électrique de commande destiné à être transmis audit appareil de traitement de données, ladite colonne pouvant subir une rotation manuelle autour d'un second axe (11) incliné par rapport audit premier axe (15) et prévu pour que la rotation de ladite colonne (10) autour dudit second axe (11) produise un second signal électrique de commande destiné à être transmis audit appareil de traitement de données, chacune desdites branches (17) comprenant, à son extrémité respective, une poignée (18), dispositif caractérisé en ce que le second axe (11) est décalé par rapport au premier axe (15) et en ce que chaque poignée (18) est incurvée par rapport à sa branche respective (17) de façon telle que, dans une première position, ladite poignée (18) soit pratiquement aligné avec sa branche respective (17) et, dans une seconde position, ladite poignée (18) s'étend à partir dudit second axe (11) dans une direction essentiellement tangentielle, ou essentiellement circonférentielle, à une trajectoire orbitale autour dudit premier axe (15).

2. Dispositif de commande selon la revendication 1, comprenant de plus un volant pouvant être adapté sur lesdites poignées (18) quand celles-ci sont dans leur seconde position respective.

3. Dispositif de commande selon la revendication 1 ou 2, dans lequel lesdits premier et second signaux de commande sont émis par des premier et second potentiomètres (21) commandés par le mouvement respectif dudit manche (16) et de ladite colonne (10) autour des premier (15) et second (11) axes.

4. Dispositif de commande selon la revendication 3, dans lequel lesdits potentiomètres sont du type rotatif et sont coaxiaux aux premier (15) et second (11) axes respectifs.

5. Dispositif de commande selon l'une quelconque des revendications 1 à 4, comprenant une base (13) sur laquelle l'extrémité inférieure de ladite colonne est montée rotative, le manche (16) étant monté rotatif sur l'extrémité supérieure de ladite colonne (10).

6. Dispositif de commande selon la revendication 5, comprenant de plus des moyens de fixation de ladite colonne (10) à ladite base (13) tels que le premier axe (15) puisse être pratiquement vertical et/ou pratiquement horizontal.

7. Dispositif de commande selon la revendication 6, dans lequel ladite colonne (10) peut effectuer un mouvement longitudinal autour du second axe (11) quand lesdits moyens de fixation (12) sont désengagés.

8. Dispositif de commande selon l'une quelconque des revendications 1 à 7, pouvant être manipulé par un opérateur, le premier axe (15) traversant l'opérateur et le second axe étant situé sous le

premier axe (15) et s'étendant sensiblement perpendiculairement à l'opérateur et devant celui-ci.

9. Dispositif de commande selon l'une quelconque des revendications 1 à 8, comprenant de plus un levier fonctionnant manuellement (24) et/ou des moyens de commande actionnables au pied (26), ledit levier (24) et lesdits moyens de commande (26) étant destinés à produire un signal électrique supplémentaire à l'appareil de traitement de données.

10. Dispositif de commande selon l'une quelconque des revendications 1 à 9, dans lequel ledit appareil de traitement de données comprend un microprocesseur et des composants associés implantés dans le dispositif de commande.

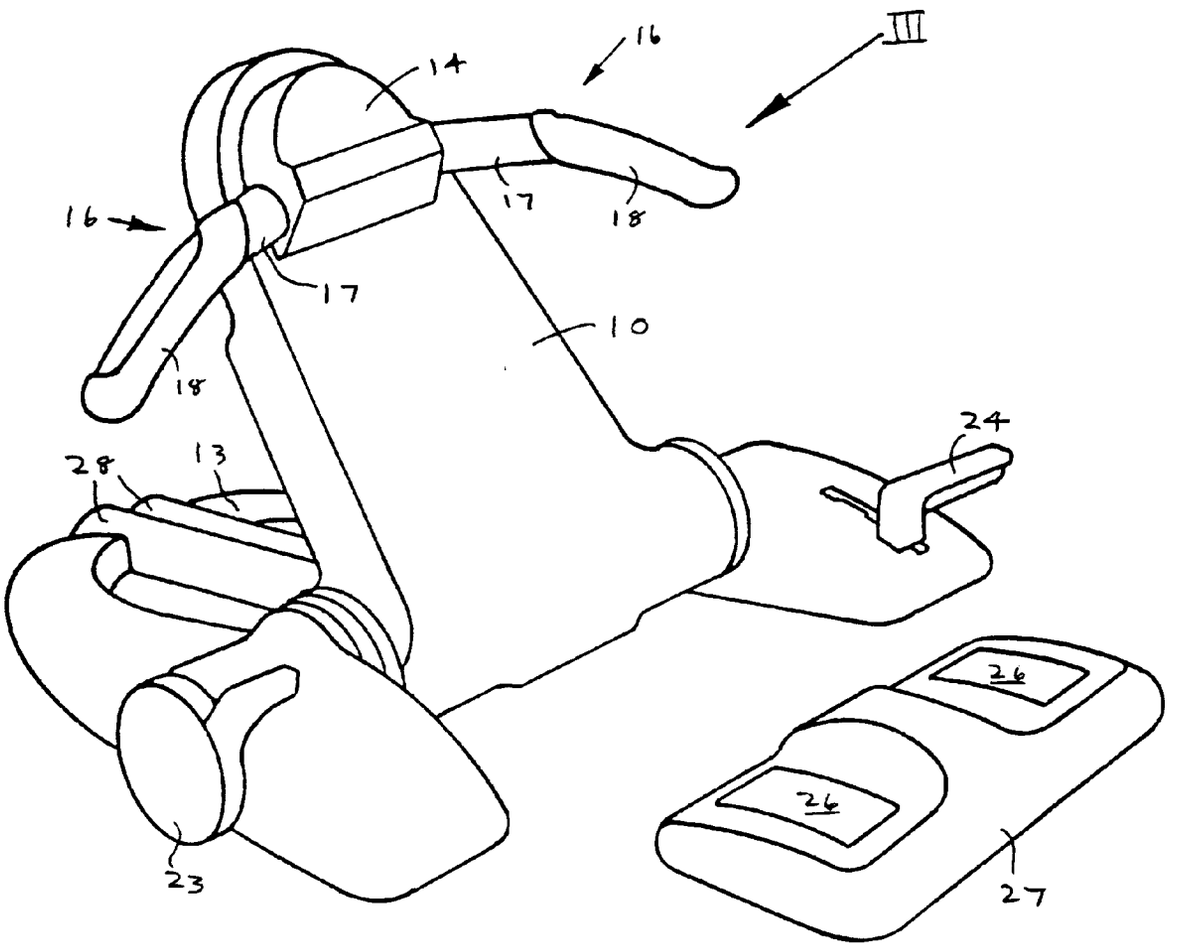


FIG. 1

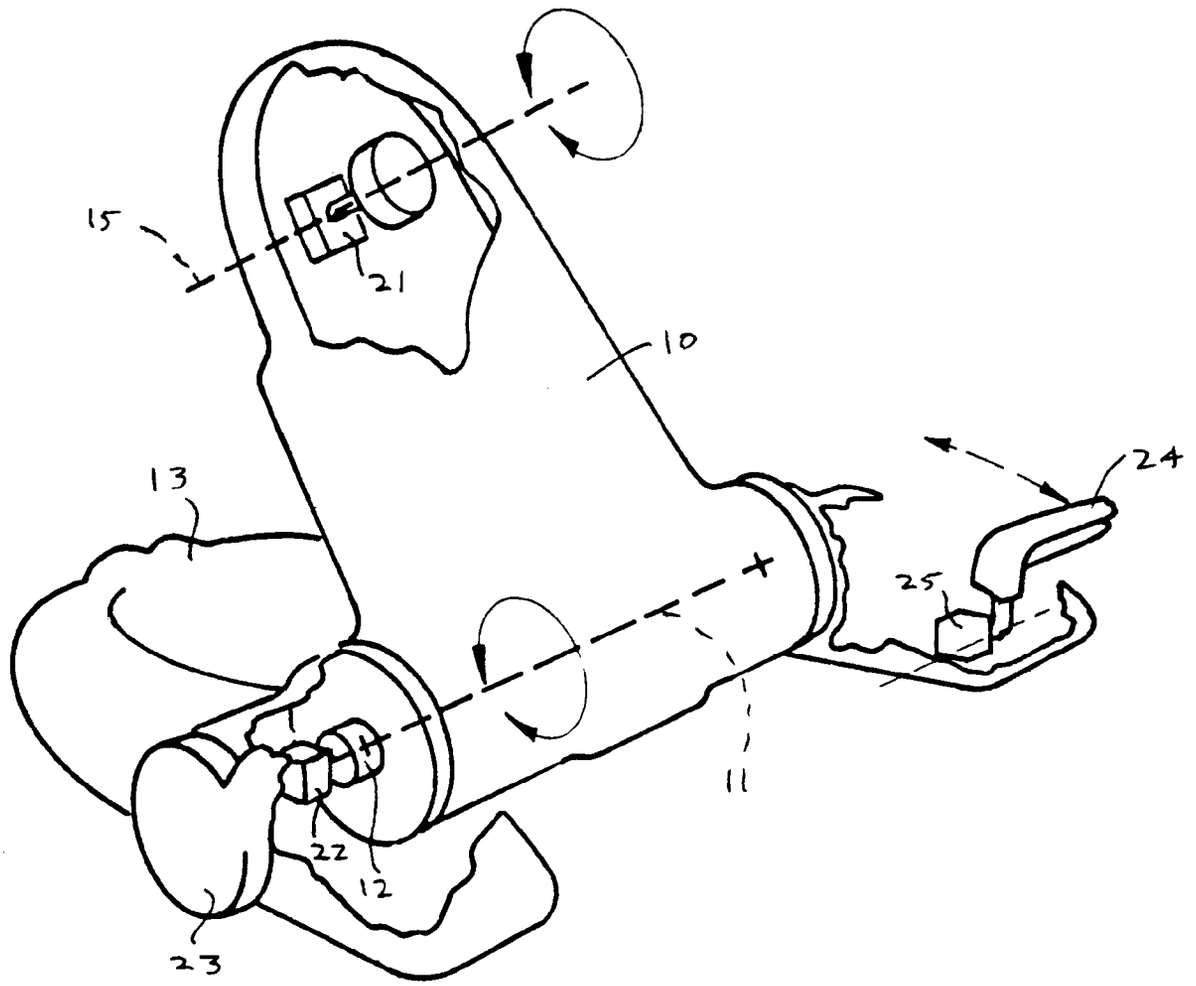


Fig.2

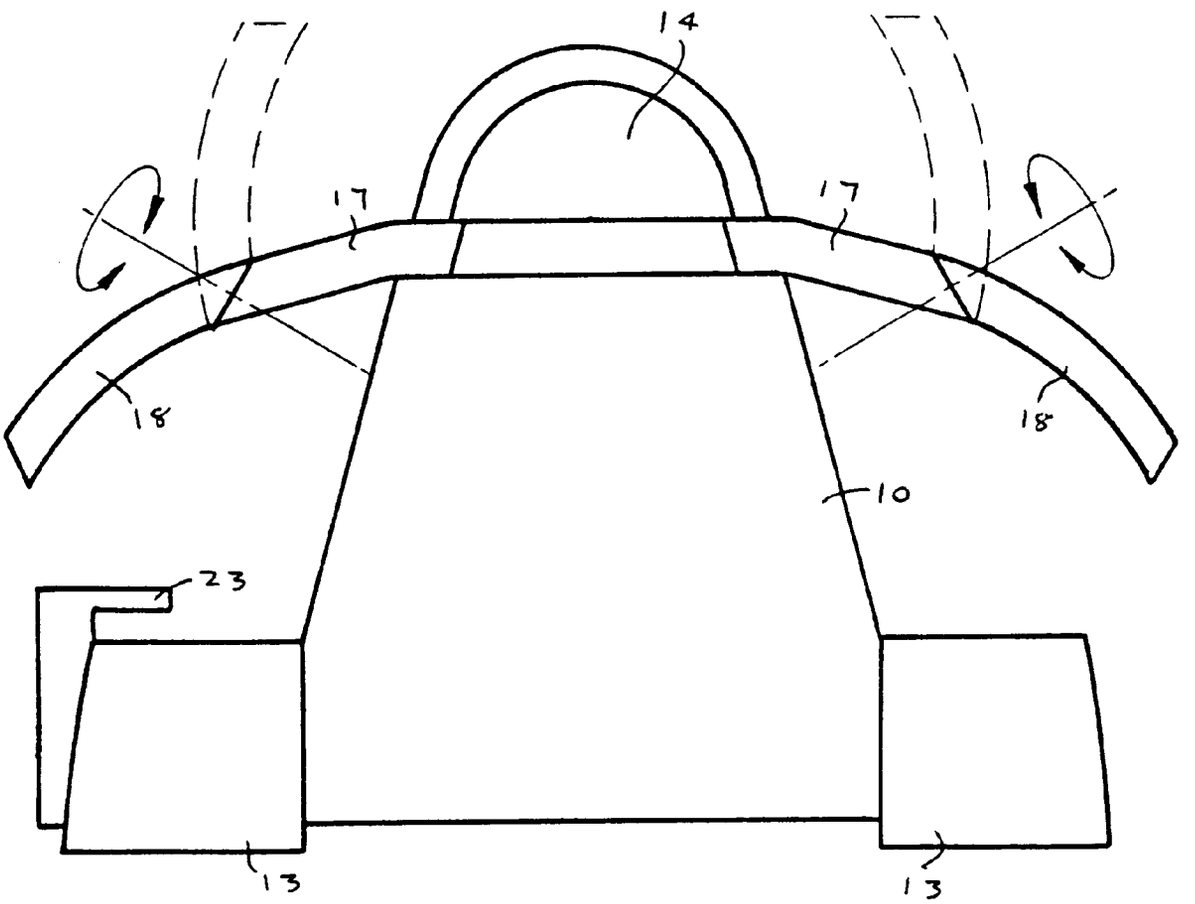


FIG. 3

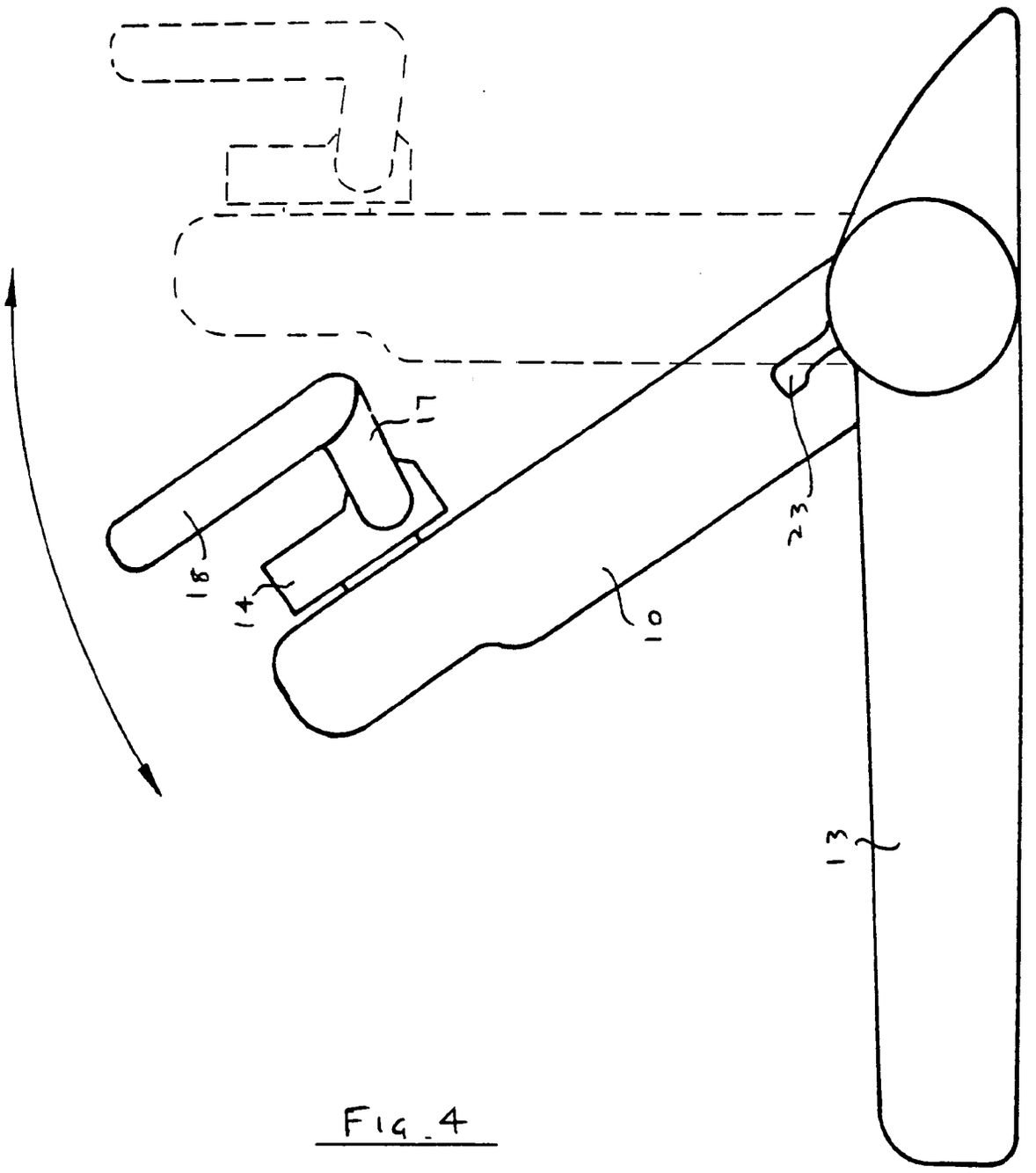


Fig. 4

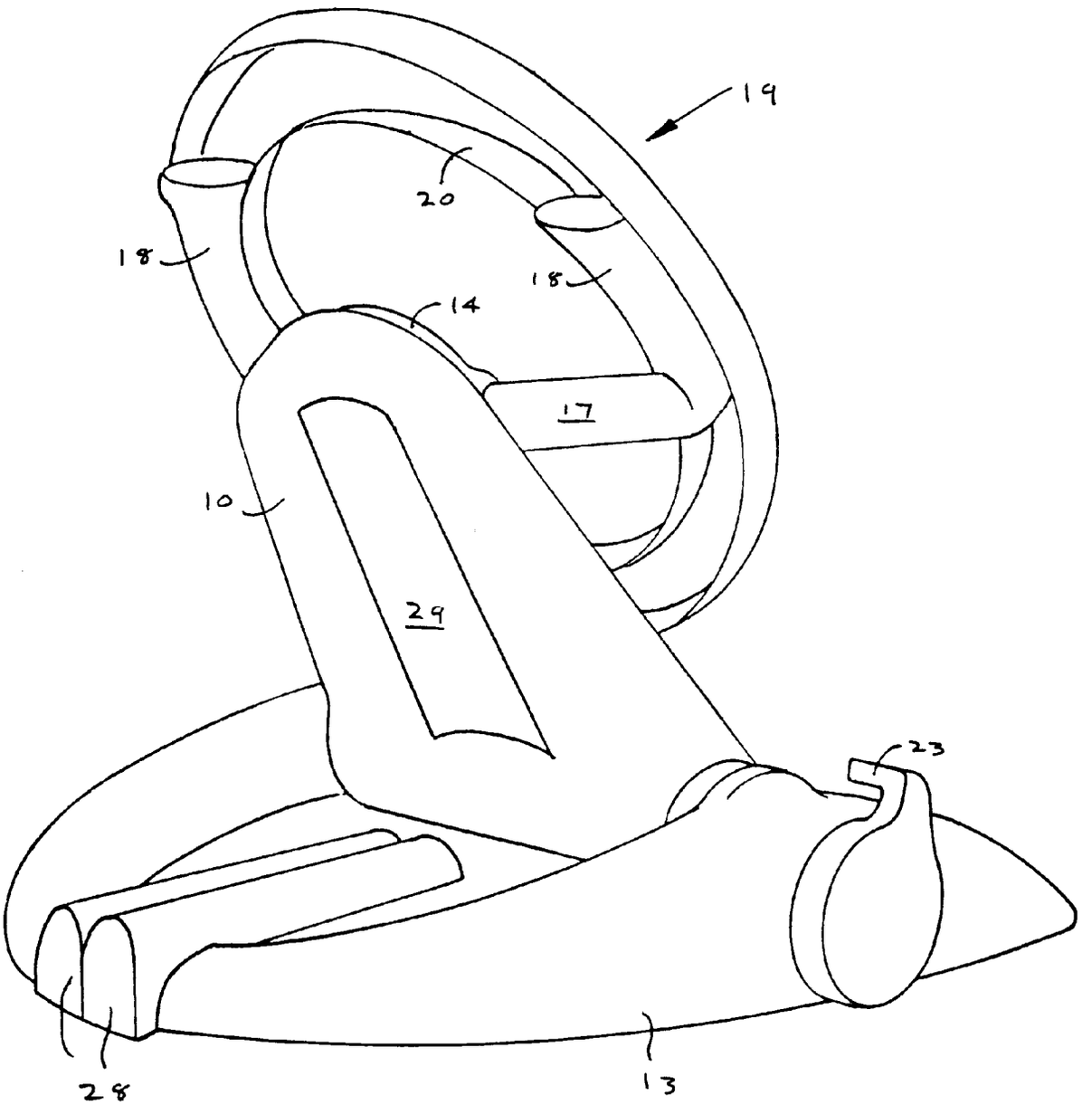


FIG. 5

FIG.6

